

Remarks on the genera *Schizocuma* Băcescu, 1972 and *Styloptocuma* Băcescu & Muradian, 1974 (Crustacea, Cumacea)

XX (330096.1)

I. PETRESCU

Department of Invertebrates, 'Grigore Antipa' National Museum of Natural History, Kiseleff I, Bucharest 79744, Romania.

SYNOPSIS. Morphological data are presented to support the view that *Schizocuma* Băcescu, 1972 and *Styloptocuma* Băcescu & Muradian, 1974 are good genera. Both genera exhibited a mixture of characters found in *Cumella* and *Nannastacus*, but share more common with *Cumella*. *Schizocuma* and *Styloptocuma* appeared to have evolved in deeper waters, earlier than the rest of *Cumella* group, having separated from a common stem with the *Nannastacus* group.

INTRODUCTION

Schizocuma Băcescu and *Styloptocuma* Băcescu & Muradian are two deep-sea genera belonging to the family Nannastacidae. Currently available descriptions of the species in these genera are incomplete, lacking data on the mouthparts or one of the sexes. In the case of *Schizocuma vema*, (known only from the holotype), the type material has been lost. Both *Schizocuma* and *Styloptocuma* have been subjects of systematic revisions by authors who have either totally or partially invalidated them (Jones 1984, Watling 1991), or considered them to be good genera (Băcescu 1992, Holt-huis 1990).

This study is based entirely on material loaned to the author by the Department of Zoology of the Natural History Museum, London.

MATERIALS AND METHODS

The material examined consists of non type specimens of 8 species, 7 of which were described by Jones (1984); all were previously identified by him and included in the genus *Cumella*. These specimens were collected by different research vessels of Woods Hole Oceanographic Institute.

Cumella acuminatum Jones, 1984 1992:700:30

86 specimens (females and immature males); collecting data – Atlantis II 31, sta.156, 0° 46' S 29° 28' W, 3459 m, 14.2.1967.

Cumella antipai (Băcescu & Muradian, 1974) 1992:678:10

13 females, 3 males (2 adults and 1 immature); collecting data – Knorr 25, sta.293, 8° 58' N 50° 04.3' W, 1518 m, 27.2.1972.

Cumella bishopi Jones, 1984 1992:677:30

44 females, 38 males (22 adults and 16 immatures); collecting data – Knorr 25, sta.293, 8° 58' N 50° 04.3' W, 1518 m, 27.2.1972.

Cumella dayae Jones, 1984 1992:684:36

22 females, 17 males (5 adults and 12 immatures); collecting data – Atlantis II 60, sta. 245, 36° 35.7' S 53° 01' W, 2707 m, 14.3.1971.

Cumella echinata Jones, 1984 1992:685:20

18 females, 4 males; collecting data – Chain 106, sta. 313, 51° 32.2' N 12° 35.9' W, 1500 m, 17.8.1972.

Cumella formosa Jones, 1984 1992:676:4

3 females, 1 immature male, 1 manca; collecting data – Atlantis II 60, sta. 245, 36° 55.7' S 53° 61.4' W, 2707 m, 14.3.1971.

Cumella spinocolata Jones, 1984 1992:783:7

3 females, 2 males and 2 juv.; collecting data – Chain 106, sta. 313, 51° 32.2' N 12° 35.9' W, 1500 m, 17.8.1972.

Cumella vema (Băcescu & Muradian, 1974) 1992:777:4

1 female, 2 immature males; collecting data – Atlantis II 31, sta.167, 7° 58' S 34° 17' W, 1007 m, 20.2.1967.

13 specimens in glycerine-alcohol on slides were dissected for this study. Measurements were taken with an ocular micrometer, and all the slides are deposited in the collections of the Natural History Museum, London.

SYSTEMATIC REMARKS

Genus *SCHIZOCUMA* Băcescu, 1972

Schizocuma Băcescu, 1972: 246.

Cumella Jones, 1984: 210–211.

Schizocuma Watling, 1991: 755.

Schizocuma Băcescu, 1992: 258–259.

TYPE SPECIES. *Schizocuma vema* Băcescu, 1972.

DIAGNOSIS. Carapace short (one-fifth the length of pleon with uropods), without carinae, with long hairs in males and dorsal spines in females (also on the ocular lobe); antero-ventral corner rounded or subacute, antero- inferior edge slightly serrated. Median ocular lobe incompletely subdivided. Branchial siphons separated, located medially to dorsolaterally; pseudorostral lobes widely separated. Pleonites long and thin, their length increasing distally up to the fifth, which is 5.5 times longer than broad. Pleotelson short. Antenna 1 without tubercle on 2nd article of peduncle, subequal in length or longer than 3rd, accessory flagellum 2-articulated. Antenna 2 with short flagellum. Pars incisiva of mandible with 4 teeth, lacinia mobilis, thin, with 3 teeth, not exceeding pars incisiva, five long plumose lifting setae between lacinia mobilis and truncated, robust, pars molaris. Maxilla 1 with simple robust acuminate setae on

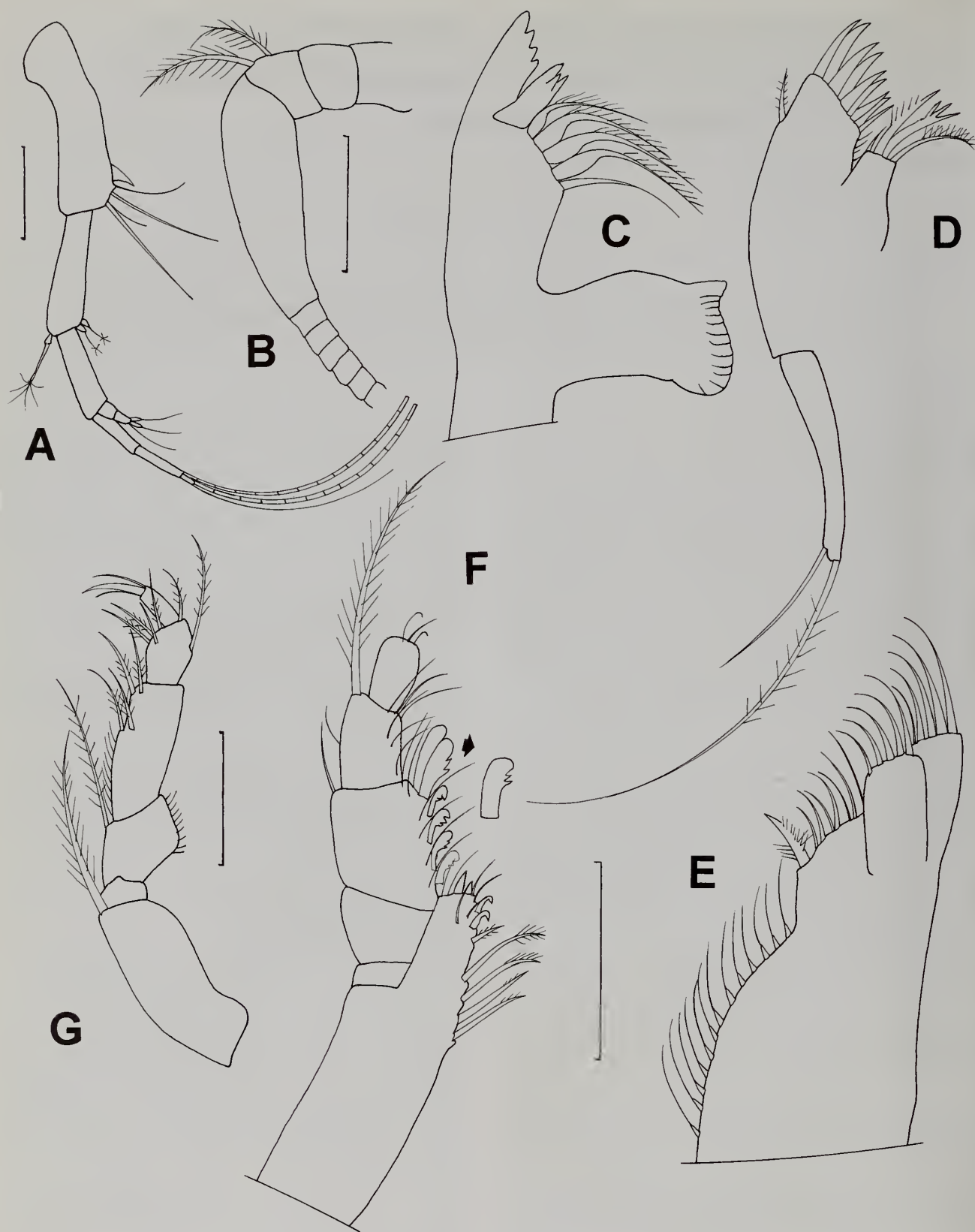


Fig. 1 *Schizocuma spinoculatum* (Jones, 1984) immature male A. antenna 1; B. antenna 2; C. mandible; D. maxilla 1; E. maxilla 2; F. maxilliped 1; G. maxilliped 2. Scale bars (in mm): A 0.1; B 0.2; C–F 0.1; G 0.1.

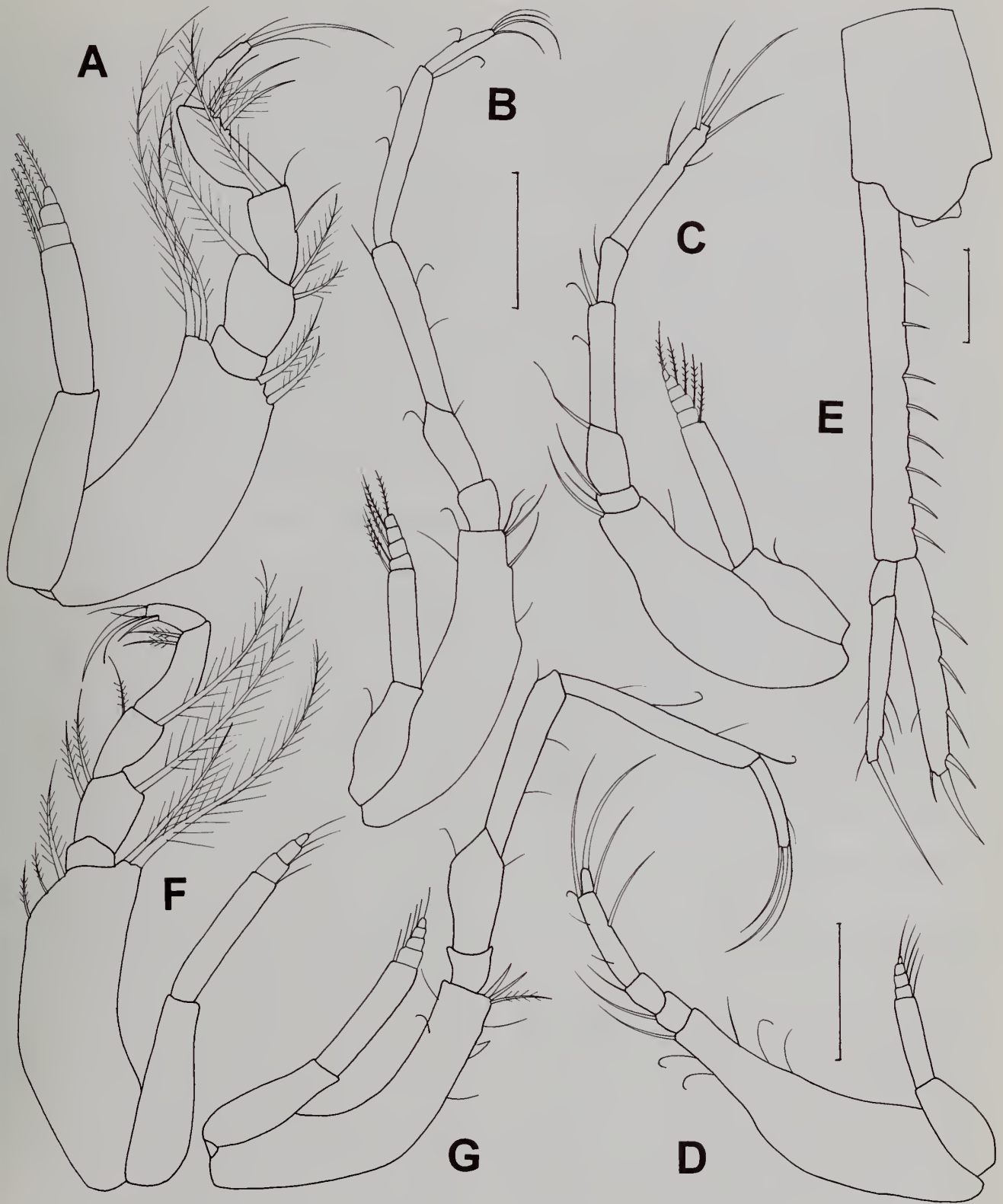


Fig. 2 *Schizocuma spinoculatum* (Jones, 1984) A–E, immature male; F, G, female A, maxilliped 3; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, uropod; F, maxilliped 3; G, pereopod 1. Scale bars (in mm): A, E 0.1; B, C, F, G 0.2; D 0.2.

protopod, palp with 2 filaments. Maxilla 2 with two endites, fine simple setae on endites and outer margins of protopod. Basis of maxilliped 1 with an outer endite not exceeding merus, carpus with flattened hand-like setae on outer margin of carpus, rounded, enlarged dactylus. Basis of maxilliped 2, longest article, merus bulky, carpus longer than all articles excepting basis, with short plumose setae on outer margin, dactylus with an apical claw. Maxilliped 3 with short inner process. Exopods on maxilliped 3 and pereopods 1–2 in females and on maxilliped 3 and pereopods 1–4 in males. Uropod peduncle much longer than pleonite 6 and its rami, uropod exopod basal article normal, endopod as long as, or slightly longer than exopod.

GENDER. Neuter.

ADDITIONAL SPECIES. *Schizocuma calmani* (Stebbing, 1912), *S. molossa* (Zimmer, 1907), *S. spinoculatum* (Jones, 1984), *S. spinosum* (Jones, 1984).

REMARKS. Băcescu (1972) considered *Schizocuma* to be distinguishable from *Cumella* only by the separated siphons and slenderness and elongation of the body and appendages. Jones (1984) argued that there is a gradation in body and appendage form and there are not sufficient criteria to recognise *Schizocuma* as a separate genus. Watling (1991) added to the characters presented by Băcescu, including dorso-lateral pseudorostral lobes and unique ocular lobe, and considered *Schizocuma* as a valid genus. The study of the mandible and maxilliped 1 revealed that there are also distinctive characters that clearly separate *Schizocuma* from *Cumella*: pars incisiva of mandible with 4 teeth (versus 3 in *Cumella*), dactylus of maxilliped 1 rounded and enlarged versus acuminate and small in *Cumella*. These last characters and the separated pseudorostral lobes and siphons are more similar to the *Nannastacus* group (*Nannastacus*, *Scherocumella*, *Schizotrema*), but the others (unique eye lobe, peduncle of antenna 1 without tubercle, maxilliped 2 with slender plumose setae on propodus, uropods with long peduncles) are more like *Cumella*. Watling (1991) mentioned in the list of the additional species of this genus the species *Schizocuma divisa* (Jones, 1984). In my opinion this species belongs to the genus *Cumella* (as described by Jones) because of its non-separated siphons, fairly short pleon and a uropodal peduncle 1.5 longer than its rami (shorter than in *Schizocuma*).

Schizocuma spinoculatum (Jones, 1984)

Figs 1, 2

Cumella spinoculata Jones, 1984: 219–220.

Schizocuma spinoculata Watling, 1991: 755.

Schizocuma spinoculatum Băcescu, 1992: 258–259.

DESCRIPTION. To the original description I am adding the following morphological data on the immature male (not mentioned by Jones). Antenna 1 (Fig. 1 A) with spine on 1st article of peduncle, 2nd article a little longer than 3rd, accessory flagellum 2-articulate. Antenna 2 (Fig. 1 B) characteristic for an older stage, with short flagellum, but most articles well developed. Mandible (Fig. 1 C), pars incisiva with 4 teeth, lacinia mobilis with 3 teeth, robust pars molaris with a tooth-like process on its distal outer corner. Maxilla 1 (Fig. 1 D), protopod with 9 acuminate setae, palp with 2 unequal filaments, the longest backwardly setulated in its proximal half. Maxilla 2 (Fig. 1 E) with simple setae on endites that exceed protopod and margins of protopod. Maxilliped 1 (Fig. 1 F), with endite of basis not exceeding extremity of merus, with strong plumose setae, acuminate setae and retinacula; flattened hand-like setae on outer margin of carpus, with rounded extremity; propodus

a little longer than dactylus (propodus/dactylus = 1.4), rounded and enlarged dactylus with few apical setae. Maxilliped 2 (Fig. 1 G), basis a third of the entire maxilliped, bulky merus, carpus, the longest article excepting basis, propodus with plumose setae on outer distal corner, dactylus as long as his strong claw. Maxilliped 3 (Fig. 2 A), basis, stronger than in female, with a very short inner process. Pereopod 1 (Fig. 2 B), basis without spines as in female, carpus as long as propodus. Pereopod 2 (Fig. 2 C), with stronger basis, a stiff acuminate seta on outer distal corner of carpus (fine, simple setae in female), dactylus a little longer than in female (dactylus/propodus = 2.5). Pereopod 3 (Fig. 2 D), basis longer than half of pereopod, dactylus with long terminal seta. Uropod (Fig. 2 E), peduncle much longer than last pleonite (1.85) and its rami (1.80), exopod a little shorter than endopod, with a terminal seta, endopod with 4 short setae on inner margin and a terminal robust short one.

Jones (1984) description of the female is amended to include the following details: Maxilliped 3 (Fig. 2 F), basis with short inner process, merus also without any process, a little longer than dactylus, dactylus with an apical, strong, claw, longer than the article. Pereopod 1 (Fig. 2 G), basis shorter than half of the entire pereopod, 2 acuminate setae on distal outer corner, carpus shorter than propodus, dactylus with a claw longer than it. Pereopod 2 (Fig. 2 G), basis shorter than half of the entire pereopod, dactylus 2.4 times longer than propodus, with short simple terminal setae.

Schizocuma vemae Băcescu, 1972

Figs 3, 4

Schizocuma vemae, Băcescu, 1972: 246.

Cumella vemae, Jones, 1984: 214

Schizocuma vemae, Watling, 1991: 755

Schizocuma vemae, Băcescu, 1992: 258–259.

DESCRIPTION. To the description of the female in Jones (1984) the following additional observations: Carapace (Fig. 3 A) with one dorsal spine (up to 4 in Jones). Pereopod 1 (Fig. 3 B), basis shorter than half of entire pereopod, carpus a little shorter than propodus, dactylus shorter than its claw. Pereopod 2 (Fig. 3 C), basis shorter than half of entire pereopod, a stiff acuminate seta on outer distal corner of carpus as long as propodus, dactylus 4.3 times longer than propodus, with simple setae. Pereopod 3 (Fig. 3 D), with thin and long articles, basis as long as half of entire pereopod, carpus 3.2 times longer than propodus, dactylus with a long terminal seta. Uropod (Fig. 3 E), peduncle very long (4 times longer than last pleonite), peduncle/rami = 2.5; exopod as long as endopod, with a terminal seta, endopod with simple setae and subterminal acuminate seta on inner margin and a terminal, thin acuminate seta.

The description of an immature male by Băcescu (1972) was also incomplete. The following details are added: Antenna 1 (Fig. 3 F), peduncle articles long and thin, 2nd article longer than 3rd, accessory flagellum, 2-articulate, shorter than basal article of main flagellum. Antenna 2 (Fig. 3 G), characteristic of an immature male. Mandible (Fig. 3 H), pars incisiva with 4 teeth, lacinia mobilis with 3 teeth, robust, truncated pars molaris with a tooth-like process. Maxilla 1 (Fig. 4 A), protopod with 9 acuminate setae, palp with 2 unequal filaments, the longest one is backwardly setulated. Maxilla 2 (Fig. 4 B), as usual for the genus. Maxilliped 1 (Fig. 4 C), carpus with flattened hand-like setae with acute extremity, propodus 3.3 times longer than dactylus, dactylus with apical fine, small setae. Maxilliped 2 (Fig. 4 D), with robust articles, as is usual for the genus. Pereopod 3 (Fig. 4 E), carpus 2.5 times longer than propodus, dactylus with a long, curved acuminate seta. Pereopod 4 (Fig. 4 F), basis thinner, carpus longer than in the previous pair (3 times longer), dactylus

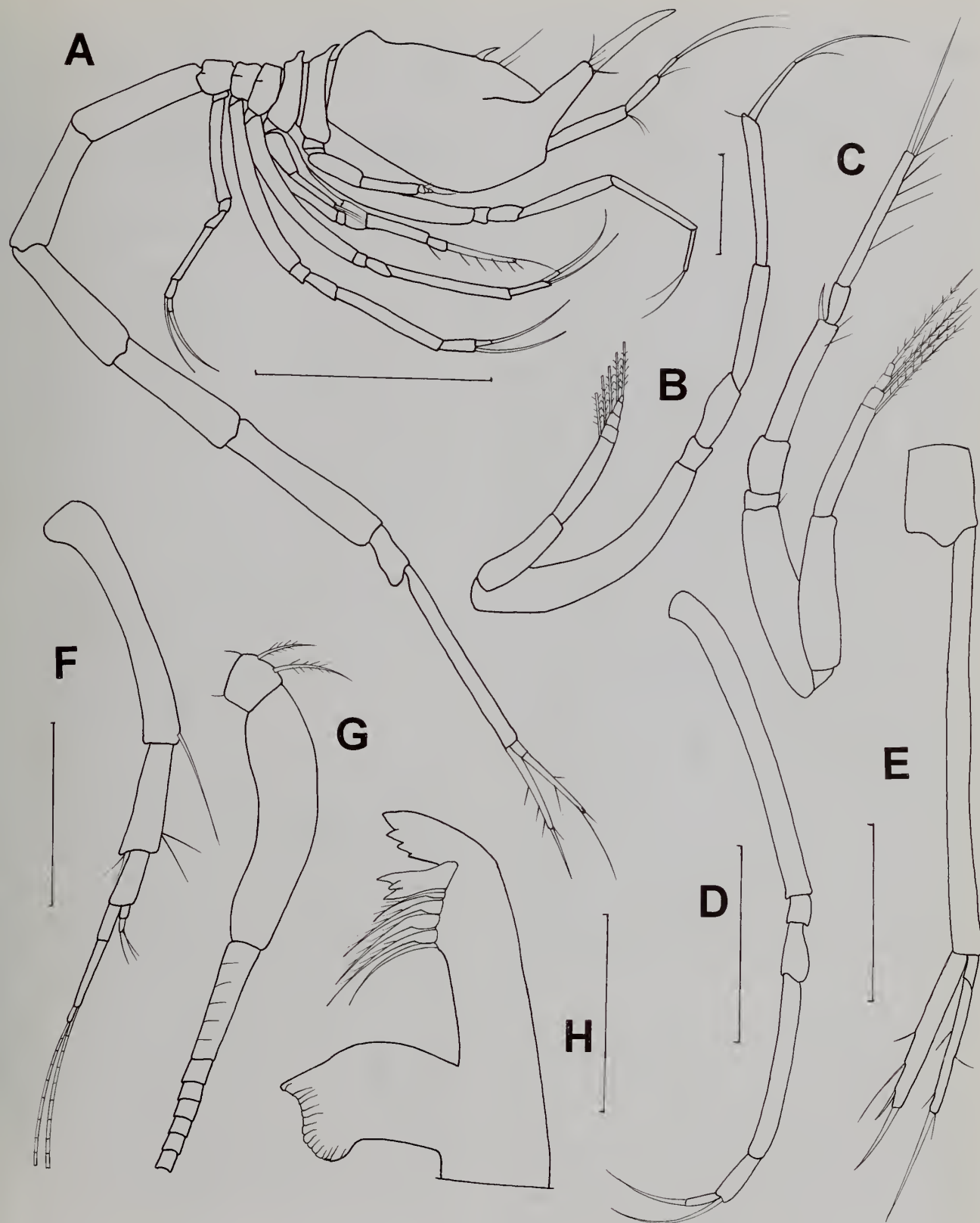


Fig. 3 *Schizocuma vema* Băcescu, 1972 A–E. female; F–H. immature male A. body, lateral view; B. pereopod 1; C. pereopod 2; D. pereopod 3; E. uropod; F. antenna 1; G. antenna 2; H. mandible. Scale bars (in mm): A 1; B 0.25; C, D 0.3; E 0.3; F, G 0.2; H 0.1.

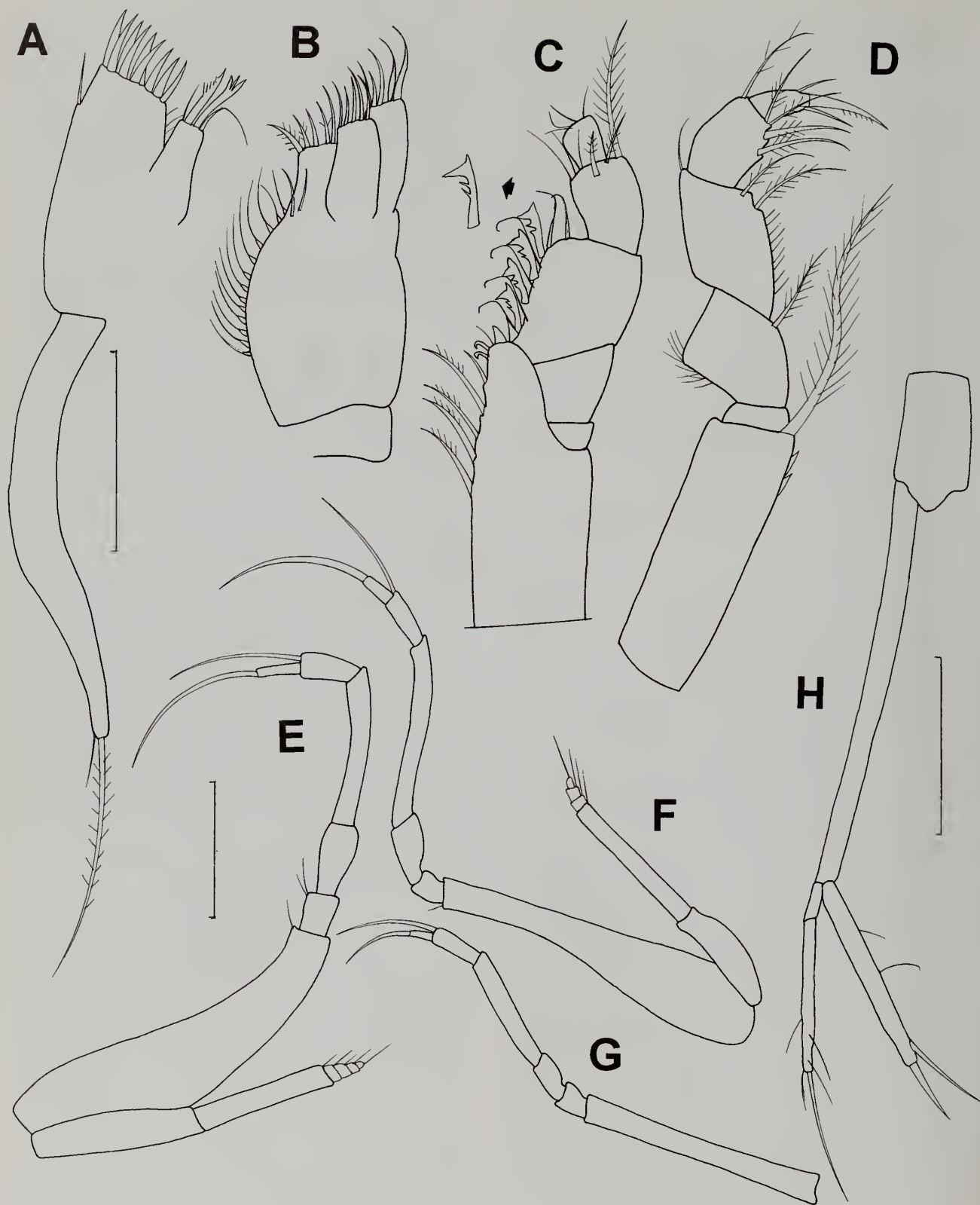


Fig. 4 *Schizocuma vemaie* Băcescu, 1972 immature male A. maxilla 1; B. maxilla 2; C. maxilliped 1; D. maxilliped 2; E. pereopod 3; F. pereopod 4; G. pereopod 5; H. uropod. Scale bars (in mm): A – D 0.1; E – G 0.2; H 0.3.

also with a terminal, long, curved acuminate seta. Pereopod 5 (Fig. 4 G), basis as long as half of entire pereopod, carpus about 2 times longer than propodus. Uropod (Fig. 4 H), peduncle shorter than in female (2:1), 2 times longer than its rami, exopod as long as endopod, with a long terminal seta, endopod with a subterminal long simple seta and a terminal acuminate seta.

REMARKS. It does not seem possible to establish a neotype for the species because the specimens from the British collection, although from the same deep western Atlantic, are far (7° 58' S 34° 17' W) from the type locality (27° 7' N 77° 08' W).

Key for the identification of *Schizocuma* species

- | | | |
|---|--|--------------------------------------|
| 1 | Spines on carapace and eye lobe | 2 |
| – | Spines on carapace or on eye lobe | 4 |
| 2 | Dorsal spines on the whole carapace | 3 |
| – | Dorsal spines only on the posterior part of carapace | <i>S. molossa</i> (Zimmer, 1913) |
| 3 | Double rows of spines on carapace | <i>S. spinosum</i> (Jones, 1984) |
| – | Single row of spines on carapace | <i>S. calmani</i> (Stebbing, 1912) |
| 4 | Spines only on eye lobe | <i>S. spinoculatum</i> (Jones, 1984) |
| – | Spines only on carapace | <i>S. vema</i> Băcescu, 1972 |

Genus *STYLOPTOCUMA* Băcescu & Muradian, 1974

Styloptocuma Băcescu & Muradian, 1974: 74–75.

Cumella Ledoyer, 1983: 77.

Cumella Jones, 1984: 210–211.

Cumella (*Styloptocuma*) Watling, 1991: 752

Styloptocuma Băcescu, 1992: 262–265.

Styloptocuma Holthuis, 1992: 262.

Cumella Ledoyer, 1997: 869 – 876.

TYPE SPECIES. *S. antipai* Băcescu & Muradian, 1974.

DIAGNOSIS. Very elongate cumacean, with numerous spines on entire body or only on carapace, long upturned pseudorostrum, long, styliform eye lobe that could reach or even exceed the extremity of pseudorostrum, without any traces of visual elements. Antenna 1 with a very long basal peduncle article (longer than half of peduncle), second article with a tubercle, main flagellum with two long articles, accessory flagellum with two articles, shorter than the first article of main flagellum. Pars incisiva of mandible with 4 teeth, lacinia mobilis with 4 (rarely 3) teeth, long stiff setae between lacinia mobilis and robust pars molaris (without any tubercles). Maxilla 1 with robust acuminate setae on protopod, palp with 2 filaments. Maxilla 2 with endites, possibly with a row of fine, small setae between the outer margin of protopod and endites. Maxilliped 1 with basis never exceeding extremity of merus, carpus with hand-like setae on outer margin, long propodus and rounded dactylus. Maxilliped 2 with long and slender basis, propodus with two plumose setae on distal outer corner, dactylus with terminal setae. Maxilliped 3 without inner process of basis, propodus longest article excepting basis, dactylus with terminal claws or setae. Pereopods and uropods very slender. Number of exopods – 3 in female, 5 in male.

GENDER. Neuter.

ADDITIONAL SPECIES. *S. aculeatum* (Jones, 1984), *S. acuminatum* (Jones, 1984), *S. angustatum* (Jones, 1984), *S. concinnum* (Jones, 1984), *S. bishopi* (Jones, 1984), *S. cristatum* (Jones, 1984), *S. dayae*

(Jones, 1984), *S. echinatum* (Jones, 1984), *S. egregium* (Hansen, 1920), *S. erectum* (Jones, 1984), *S. extans* (Jones, 1984), *S. formosum* (Jones, 1984), *S. gracillimum* (Calman, 1905), *S. inermis* (Ledoyer, 1997), *S. longisipho* (Jones, 1984), *S. subductum* (Jones, 1984).

REMARKS. Jones (1984) considered *Styloptocuma* to be a synonym of *Cumella* because there did not seem to be any characters that could be used to separate the genus (pseudorostrum, eye lobe, form of body, antennule, pereopods and uropods). The absence of mouthparts, especially maxilliped 1, from the descriptions, and no importance accorded to the tubercle on the antennule, also caused Ledoyer (1983, 1997) to adopt Jones' view. In his revision of some genera of nannastacids based on earlier descriptions, Watling 1991 concluded that *Styloptocuma* could be considered a subgenus of *Cumella*. Holthuis (1992) discussed only the designation of the type species of this genus and accepted the concept of *Styloptocuma* in Băcescu & Muradian (1974) without any further comment.

Styloptocuma possesses a mixture of characters that unite it with most of the *Cumella* group – non-separated pseudorostral lobes, a unique eye lobe, form of carapace, lacinia mobilis of mandible with 3 teeth, propodus of maxilliped 2 with setae, thin pereopods, long uropods; and to the *Nannastacus* group – antenna 1 with tubercle, mandible with 4 teeth on pars incisiva and lacinia mobilis, long, rounded dactylus of maxilliped 1. Maxilla 2 has features of both groups (the tranverse row of setules on the protopod is characteristic for the *Nannastacus* group; absent in *Cumella*). This genus seems to link these groups and therefore has a unique set of characters.

Styloptocuma acuminatum (Jones, 1984)

Figs 5,6

Cumella acuminata Jones, 1984: 220–221.

Cumella (*Styloptocuma*) *acuminata* Watling, 1991: 752.

Styloptocuma acuminatum Băcescu, 1992: 262.

DESCRIPTION. A brief description of the distinctive characters of the immature male not mentioned by Jones is given. Antenna 2 as in Fig. 5 B. Maxilliped 3 (Fig. 5 C) has a longer basis and dactylar claw than in the female. Pereopod 1 (Fig. 5 D) with an acuminate seta on outer distal corner of basis. Pereopod 2 (Fig. 5 E) with teeth on outer margin of basis and a shorter dactylus (shorter than carpus). Pereopods 3 and 4 (Fig. 5 F, G) with exopods, carpus longest article of pereopod excepting basis, dactylus with a long curved terminal seta. Pereopod 5 (Fig. 5 H) with the shortest basis of all pereopods, carpus shorter than in pairs 3 and 4. Uropod (Fig. 5 I) with peduncle 1.2 longer than the last pleonite and 1.8 times longer than its rami; subequal rami, exopod with a terminal short acuminate seta, endopod with 5 slender acuminate setae on inner margin and a short terminal robust acuminate seta.

To the description of female in Jones (1984) the following details are added: Antenna 1 (Fig. 5 J, K) with a tubercle on the 2nd article of the peduncle. Mandible (Fig. 5 L), pars incisiva with 4 teeth, lacinia mobilis with 4 teeth (one of them very small), truncated pars molaris. Maxilla 1 (Fig. 6 A) with robust acuminate setae on protopod and palp with 2 filaments, the longest being backwardly setulated in its proximal half. Maxilla 2 (Fig. 6 B) without a row of fine, small setae between endites and outer margin of protopod. Maxilliped 1 (Fig. 6 C) with a bifid robust acuminate seta on endite of basis, carpus with hand-like flattened setae with 6 denticles, dactylus smaller than propodus, enlarged, with excavated distal margin. Maxilliped 2 (Fig. 6 D), slender basis, carpus longest article excepting basis, propodus with plumose setae, dactylus with a curved claw. Maxilliped 3 (Fig. 6 E), basis without inner process, dactylus with terminal setae. Pereopod 3 (Fig. 6 H), with slender

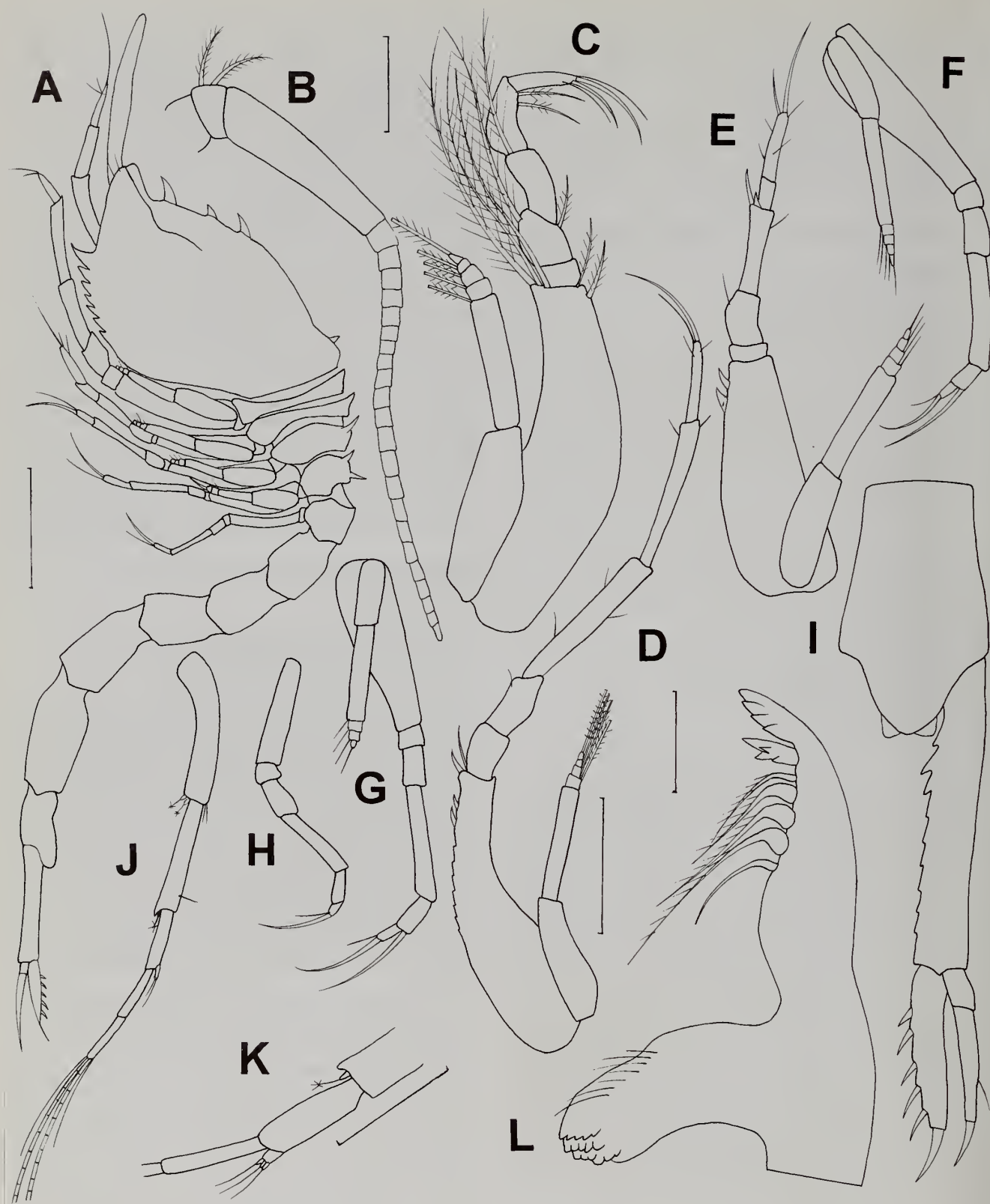


Fig. 5 *Styloptocuma acuminatum* (Jones, 1984) A–I. immature male; J–L. female A. body, lateral view; B. antenna 2; C. maxilliped 3; D. pereopod 1; E. pereopod 2; F. pereopod 3; G. pereopod 4; H. pereopod 5; I. uropod; J. antenna 1; K. antenna 1, detail; L. mandible. Scale bars (in mm): A 0.5; B, D–J 0.2; C 0.1; K 0.1; L 0.05.

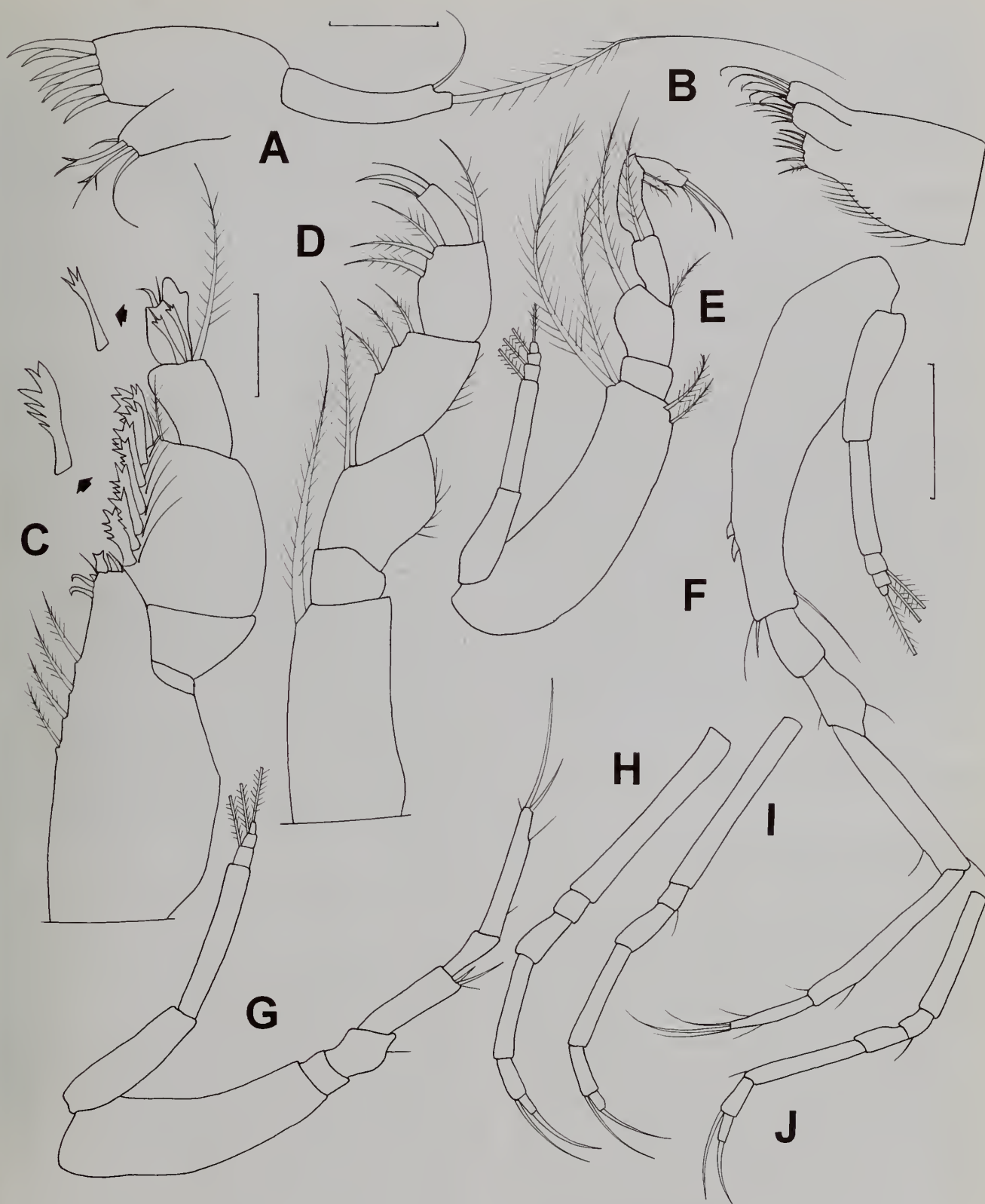


Fig. 6 *Styloptocuma acuminatum* (Jones, 1984) female A. maxilla 1; B. maxilla 2; C. maxilliped 1; D. maxilliped 2; E. maxilliped 3; F. pereopod 1; G. pereopod 2; H. pereopod 3; I. pereopod 4; J. pereopod 5. Scale bars (in mm): A 0.1; B – D 0.05; E – J 0.2.

articles, basis shorter than half of pereopod, carpus longest article of pereopod excepting basis, dactylus with a long curved apical seta. Pereopod 4 (Fig. 6 I), similar to the previous pair. Pereopod 5 (Fig. 6 J) with the smallest basis of all pereopods and with carpus longer than in the pairs 3 and 5.

REMARKS. Pereopod 1 (Fig. 6 F) has a basis with two teeth on outer margin (absent in description given in Jones 1984). Pereopod 2 (Fig. 6 G) has a shorter dactylus than is suggested in the original description.

Styloptocuma antipai Băcescu & Muradian, 1974

Fig. 7

Styloptocuma antipai Băcescu & Muradian, 1974: 74–75.

Cumella antipai Jones, 1984: 214.

Cumella (Styloptocuma) antipai Watling, 1991: 752

Styloptocuma antipai Băcescu, 1992: 262.

DESCRIPTION. The description of an immature male including the mouth appendages is given. Mandible (Fig. 7 A) as in *S. acuminatum*. Maxilla 1 (Fig. 7 B) with glabrous filaments. Maxilla 2 (Fig. 7 C) as in *S. acuminatum*. Maxilliped 1 (Fig. 7 D) with hand-like flattened setae on carpus (different form than in *S. acuminatum*), rounded and enlarged dactylus. Maxilliped 3 (Fig. 7 E) as in female described by Băcescu & Muradian (1974). Pereopod 1 (Fig. 7 F), with carpus as long as propodus instead of carpus shorter than propodus of female (as given in Băcescu & Muradian 1974 and Jones 1984). Pereopod 2 (Fig. 7 G), as in female, but with glabrous margins of basis and dactylus with a shorter terminal seta. Pereopod 3 (Fig. 7 H), basis half of pereopod, dactylus with a terminal strong curved claw. Pereopods 1–4 with exopods. Uropod (Fig. 7 I), peduncle 2 times longer than the last pleonite, 1.5 times longer than its rami, inner margin serrated; subequal rami, exopod with simple setae on both margins and a long terminal one, endopod with three acuminate setae on inner margin and a terminal robust acuminate seta a little shorter than on exopod.

Styloptocuma bishopi (Jones, 1984)

Figs 8, 9

Cumella bishopi Jones, 1984: 233.

Cumella (Styloptocuma) bishopi Watling, 1991: 752

Styloptocuma bishopi Băcescu, 1992: 263.

DESCRIPTION. A description of immature male is given. Antenna 1 (Fig. 8 A), 1st article of peduncle shorter than remaining articles, 2nd article with a tubercle with pedunculate setae. Mandible (Fig. 8 B), pars incisiva with 4 teeth, robust lacinia mobilis with 3 teeth, truncated pars molaris. Maxilla 1 (Fig. 8 C), as in *S. antipai*, with glabrous filaments. Maxilla 2 (Fig. 8 D), with a row of fine, small setae between endites and outer margin of protopod. Maxilliped 1 (Fig. 8 E), endite of basis with 2 spatulate setae, carpus with hand-like flattened setae with 6 denticles, rounded dactylus. Maxilliped 2 (Fig. 8 F), as usual for the genus. Maxilliped 3 (Fig. 8 G), basis and merus without teeth. Pereopod 1 (Fig. 8 H), as in female. Pereopod 2 (Fig. 8 I), as in female, with larger basis. Pereopod 3 (Fig. 9 A), basis half of pereopod, carpus 2 times longer than propodus. Pereopod 4 (Fig. 9 B), basis shorter than half of pereopod, carpus 3 times longer than propodus. Pereopod 5 (Fig. 9 C), slender articles, carpus 3.8 times longer than propodus.

The description in Jones (1984) is augmented with the following details: Pereopod 3 (Fig. 9 G), basis half of pereopod, with serrated outer margin, carpus/propodus = 1.6, dactylus with a short curved

claw. Pereopod 4 (Fig. 9 H), basis shorter than half of pereopod, with a serrated outer margin, longer carpus (carpus/propodus = 2.5). Pereopod 5 (Fig. 9 I), basis shorter than half of pereopod, with serrated outer margin, carpus longer than in the pairs 3 and 4 (carpus/propodus = 2.8).

REMARKS. Differences noted in specimens examined for this study include: maxilliped 3 (Fig. 9 D) with a tooth on inner margin of merus, pereopod 1 (Fig. 9 E) with teeth also on the outer margin, carpus longer than propodus (versus carpus shorter than propodus), pereopod 2 (Fig. 9 F), with 2 stiff acuminate setae on outer distal corner of carpus (instead of simple setae).

Styloptocuma dayae (Jones, 1984)

Figs 10, 11

Cumella dayae Jones, 1984: 226–227.

Cumella (Styloptocuma) dayae Watling, 1991: 752.

Styloptocuma dayae Băcescu, 1992: 263

DESCRIPTION. The description of the female is supplemented with additional data on antenna 1, mouthpieces and maxillipeds 1, 2 and pereopods 3–5. Antenna 1 (Fig. 10 A), 2nd article of peduncle with a short tubercle. Mandible (Fig. 10 B), pars incisiva with 4 teeth (one of them is very short), strong lacinia mobilis with 3 teeth. Maxilla 1 (Fig. 10 C), protopod with robust acuminate setae and palp with 2 glabrous filaments. Maxilla 2 (Fig. 10 D), no row of fine, small setae between endites and outer margin of protopod. Maxilliped 1 (Fig. 10 E), carpus with hand-like flattened setae with 4 denticles, rounded and enlarged dactylus. Maxilliped 2 (Fig. 10 F), as usual for the genus. Pereopod 3 (Fig. 10 G), basis longer than half of pereopod, tiny dactylus with a long terminal seta. Pereopod 4 (Fig. 10 H), basis shorter than half of pereopod, carpus shorter than in the previous pair. Pereopod 5 (Fig. 10 I), basis shorter than half of pereopod, carpus longer than in pairs 3 and 4.

Some details on the structure of the immature male are also provided. Maxilliped 3 (Fig. 11 A), basis without the short process mentioned by Jones for the female. Pereopods 1 and 2 (Fig. 11 B, C), as in female. Pereopod 3 (Fig. 11 D), basis half of pereopod, carpus/propodus: 1.8, tiny dactylus with long terminal seta. Pereopod 4 (Fig. 11 E), basis shorter than half of pereopod, carpus/propodus: 1.7. Pereopod 5 (Fig. 11 F), basis shorter than carpus, carpus/propodus: 3.1.

Styloptocuma echinatum (Jones, 1984)

Figs 12, 13

Cumella echinata Jones, 1984: 223–224.

Cumella (Styloptocuma) echinata Watling, 1991: 752.

Styloptocuma echinatum Băcescu, 1992: 263.

DESCRIPTION. This species was incompletely described in Jones (1984), his description being based only the female. Additional details for immature males and females are included here. *Immature male* – Antenna 1 (Fig. 12 A), 1st article of peduncle twice longer than the rest of antenna, 2nd article with a tubercle. Mandible (Fig. 13 B), pars incisiva with 4 teeth, lacinia mobilis also with 4 teeth (one of them very short). Maxilla 1 (Fig. 13 C), palp with 2 glabrous filaments. Maxilla 2 (Fig. 13 D), long fine setae on outer margin of protopod, but not between its outer margin and endites. Maxilliped 1 (Fig. 13 E), carpus with hand-like flattened setae with 4 denticles, rounded and enlarged dactylus. Maxilliped 2 (Fig. 13 F), as usual for the genus. Maxilliped 3 (Fig. 13 G), basis without inner process, dactylus with 2 claws. Pereopod 1 (Fig. 13 H), basis with rows of

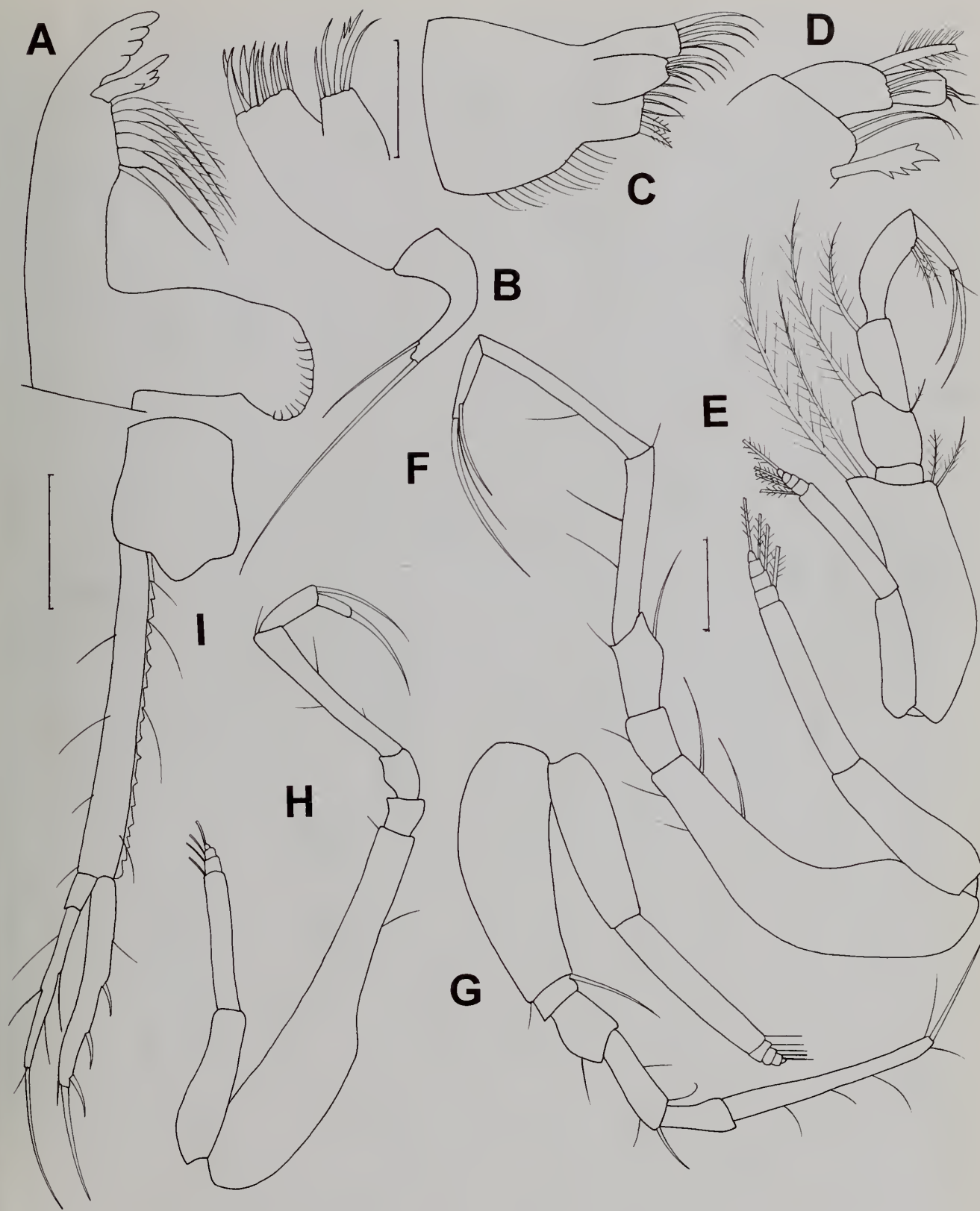


Fig. 7 *Styloptocuma antipai* Băcescu & Muradian, 1974 immature male A. mandible; B. maxilla 1; C. maxilla 2; D. tip of maxilliped 1; E. maxilliped 3; F. pereopod 1; G. pereopod 2; H. pereopod 3; I. uropod. Scale bars (in mm): A – D 0.05; E – H 0.1; I 0.2.

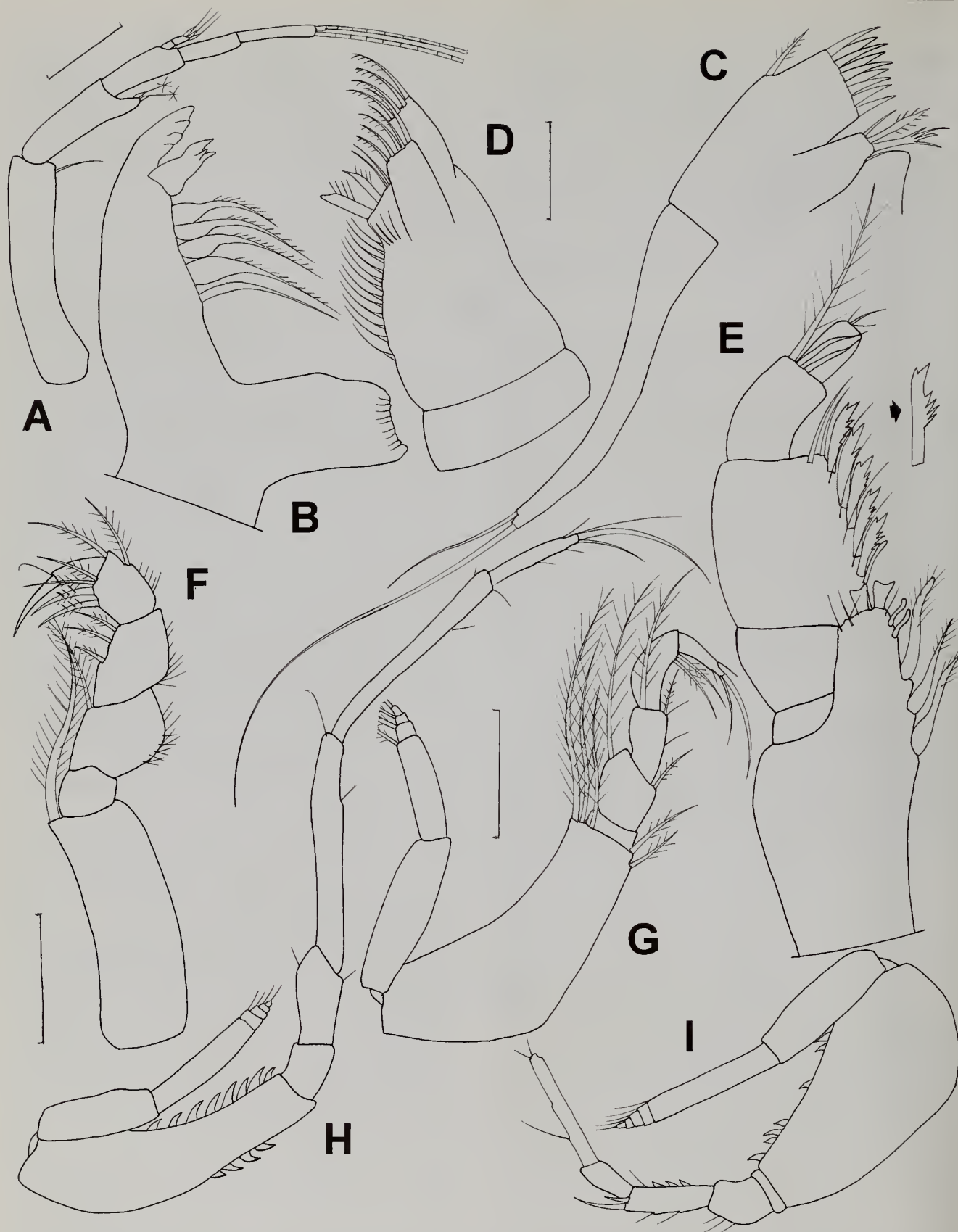


Fig. 8 *Styloptocuma bishopi* (Jones, 1984) immature male A. antenna 1; B. mandible; C. maxilla 1; D. maxilla 2; E. maxilliped 1; F. maxilliped 2; G. maxilliped 3; H. pereopod 1; I. pereopod 2. Scale bars (in mm): A 0.1; B – E 0.05; F 0.1; G – I 0.2.

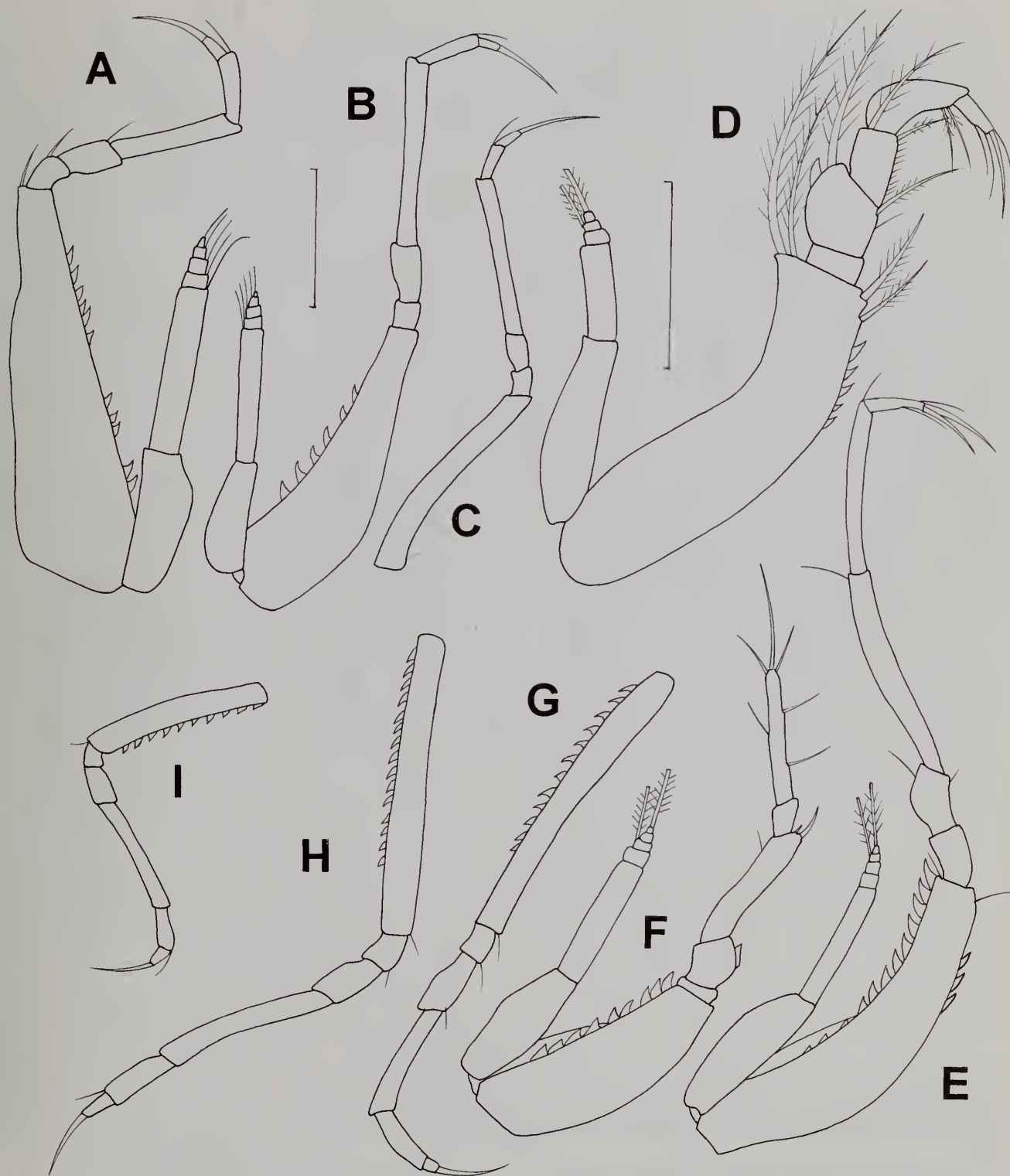


Fig. 9 *Styloptocuma bishopi* (Jones, 1984) A – C. immature male; D – I. female A. pereopod 3; B. pereopod 4; C. pereopod 5; D. maxilliped 3; E. pereopod 1; F. pereopod 2; G. pereopod 3. H. pereopod 4; I. pereopod 5. Scale bars (in mm): A – C, E, F – I 0.2; D 0.2.

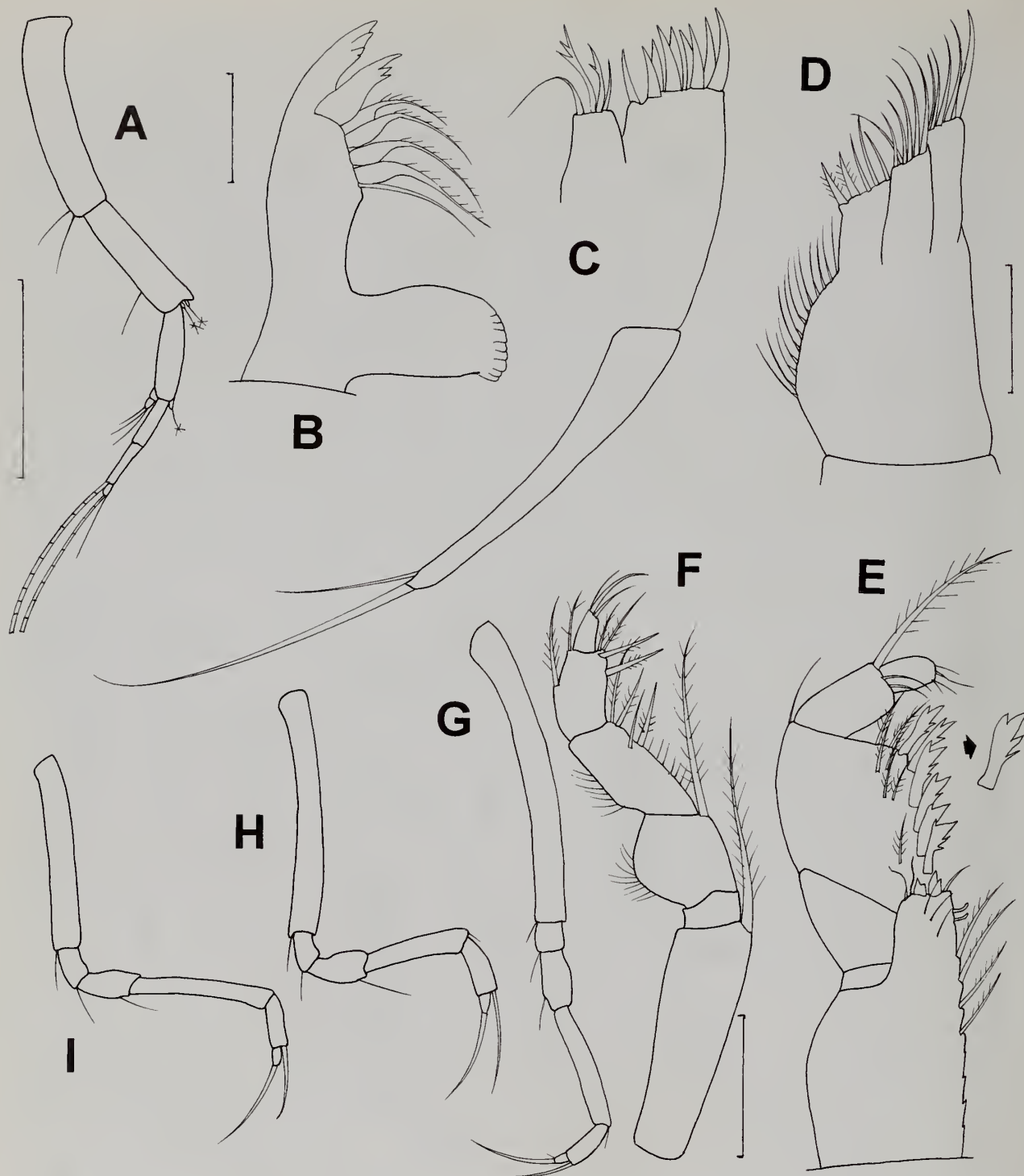


Fig. 10 *Styloptocuma dayae* (Jones, 1984) female A. antenna 1; B. mandible; C. maxilla 1; D. maxilla 2; E. maxilliped 1; F. maxilliped 2; G. pereopod 3; H. pereopod 4; I. pereopod 5. Scale bars (in mm): A 0.2; B, E 0.05; C, D 0.05; F 0.1.

teeth on both margins, very long and slender carpus and propodus, carpus a little longer than propodus. Pereopod 2 (Fig. 14 A), carpus with teeth on inner margin and with 2 stiff acuminate setae on outer distal corner, dactylus 3 times longer than propodus, with simple setae. Pereopod 3 (Fig. 14 B), basis longer than half of pereopod, carpus/propodus: 1.9, tiny dactylus with a long curved terminal seta. Pereopod 4 (Fig. 14 C), basis shorter than half of pereopod, carpus/

propodus: 2.9, dactylus as in previous pair. Pereopod 5 (Fig. 14 D), basis shorter than half of pereopod, carpus/propodus: 1.6, same type of dactylus.

Female – Maxilliped 3 (Fig. 14 E), as in male. Pereopod 1 (Fig. 14 F), teeth only on outer margin of basis, carpus shorter than propodus. Pereopod 2 (Fig. 14 G), as in male. Pereopods 3–5 (Fig. 14 H–J),

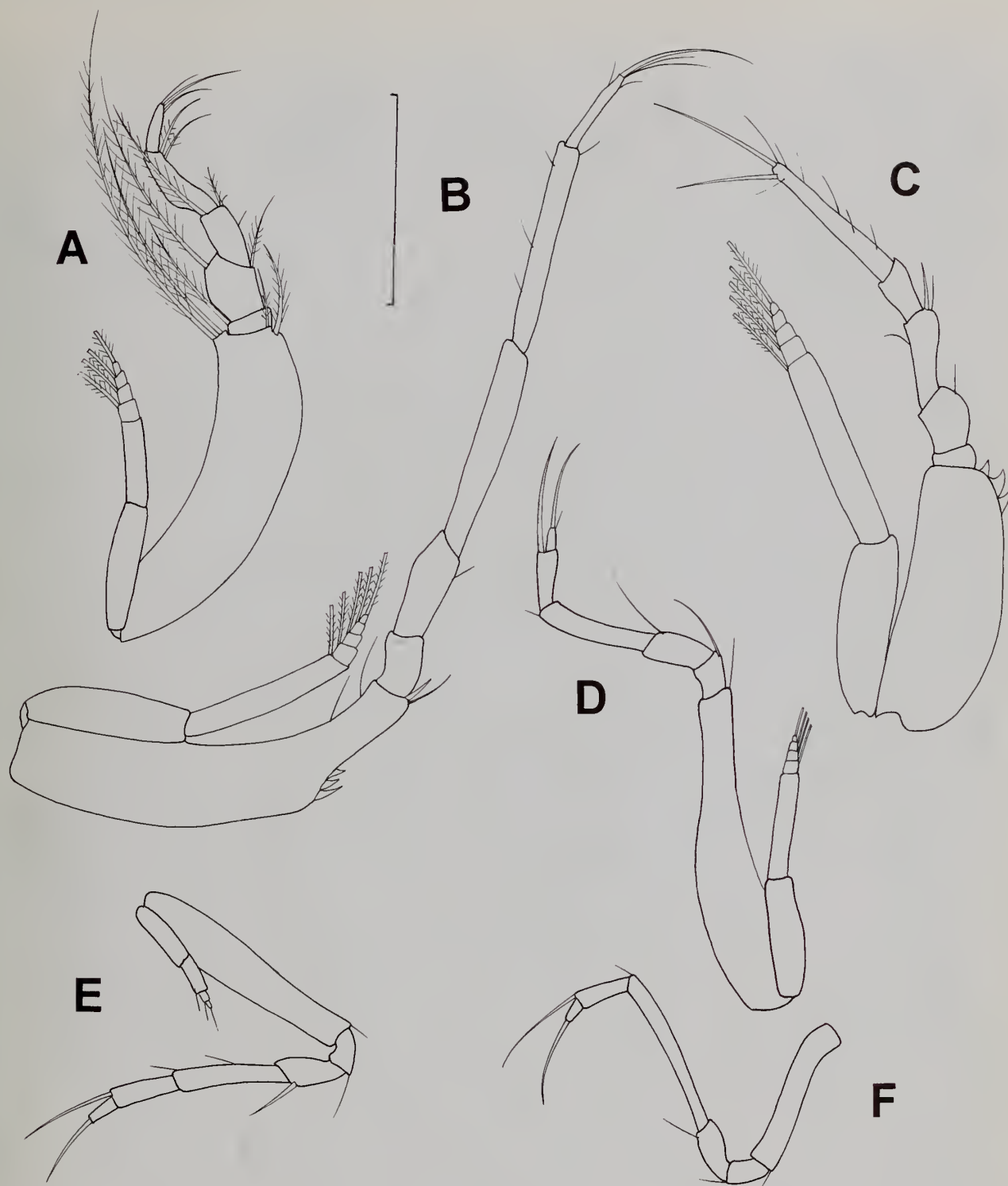


Fig. 11 *Styloptocuma dayae* (Jones, 1984) immature male A. maxilliped 3; B. pereopod 1; C. pereopod 2; D. pereopod 3; E. pereopod 4; F. pereopod 5. Scale bar (in mm): A – F 0.3.

very elongated and slender, with the same ratio between articles as in male.

***Styloptocuma formosum* (Jones, 1984)**

Figs 14, 15

Cumella formosa Jones, 1984: 231–233.

Cumella (Styloptocuma) formosa Watling, 1991: 752.

Styloptocuma formosum Băcescu, 1992: 264.

DESCRIPTION. To the description of the adult female in Jones (1984) the following details are added: Antenna 2 (Fig. 14 B), with

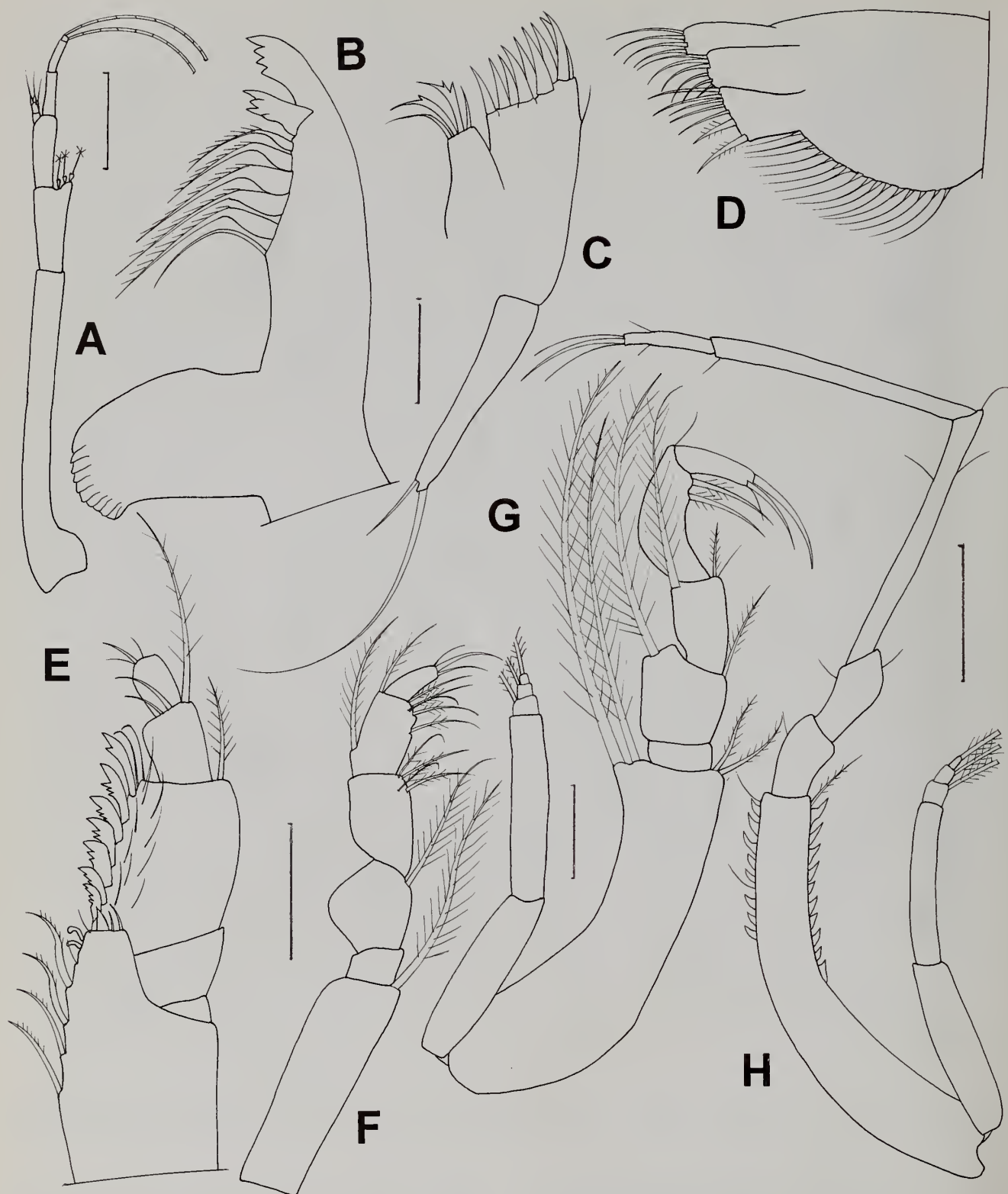


Fig. 12 *Styloptocuma echinatum* (Jones, 1984) immature male A. antenna 1; B. mandible; C. maxilla 1; D. maxilla 2; E. maxilliped 1; F. maxilliped 2; G. maxilliped 3; H. pereopod 1. Scale bars (in mm): A 0.1; B – E 0.05; F 0.1; G 0.1; H 0.2.

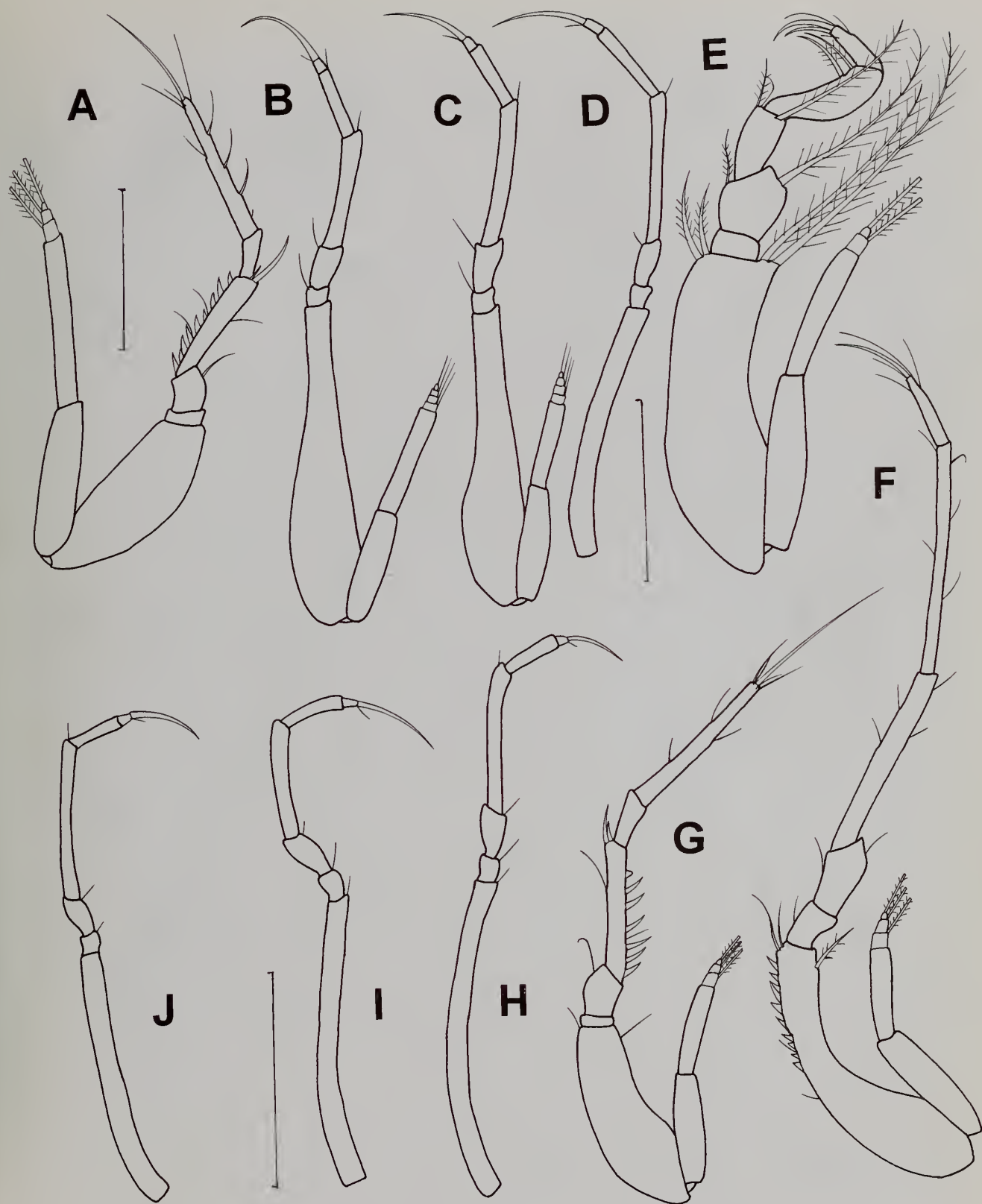


Fig. 13 *Styloptocuma echinatum* (Jones, 1984) A – D, immature male; E–J, female A, pereopod 2; B, pereopod 3; C, pereopod 4; D, pereopod 5; E, maxilliped 3; F, pereopod 1; G, pereopod 2; H, pereopod 3; I, pereopod 4; J, pereopod 5. Scale bars (in mm): A – D 0.3; E 0.5; F – J 0.5.

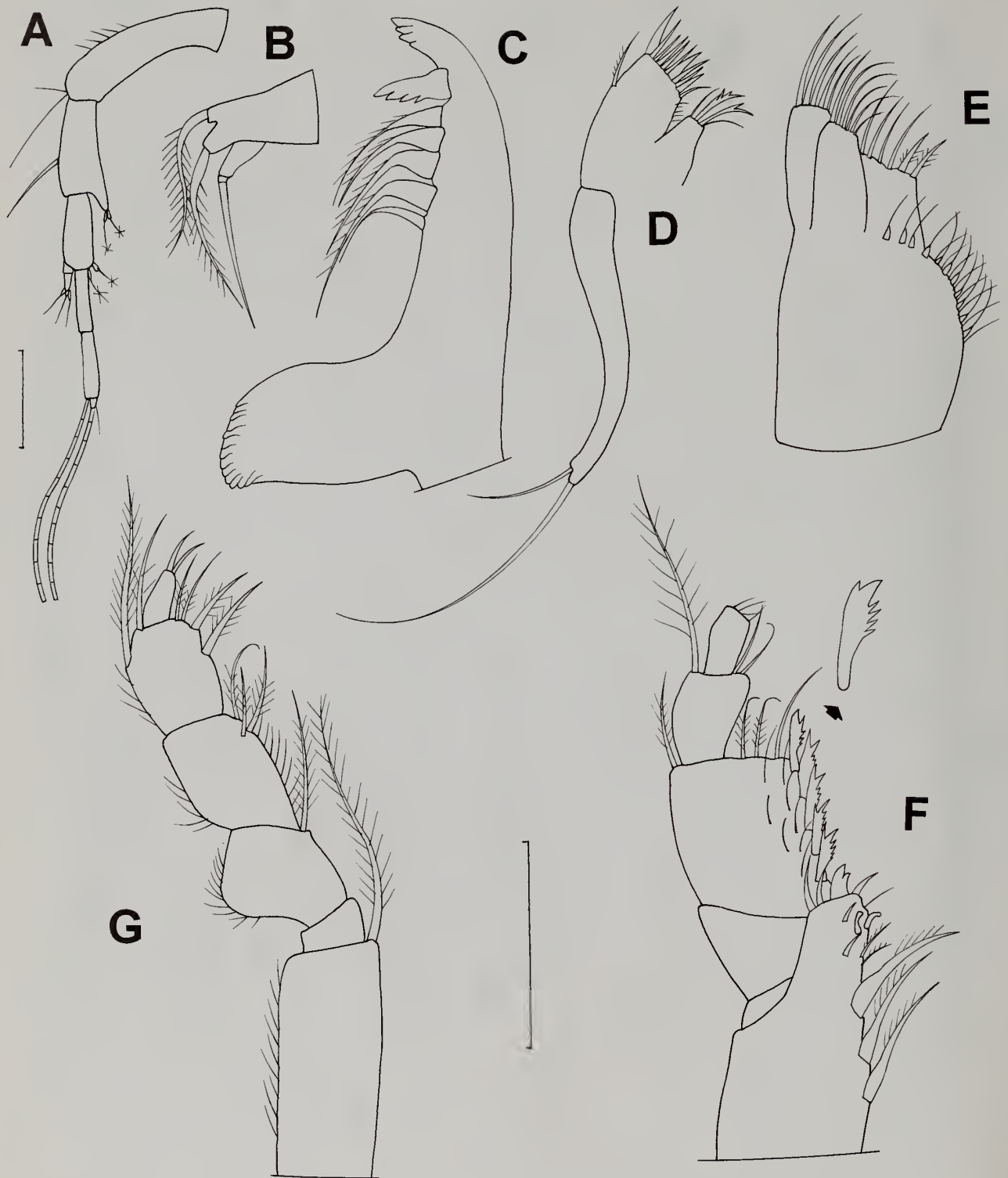


Fig. 14 *Styloptocuma formosum* (Jones, 1984) female A. antenna 1; B. antenna 2; C. mandible; D. maxilla 1; E. maxilla 2; F. maxilliped 1; G. maxilliped 2. Scale bars (in mm): A, B 0.1; C – G 0.1.

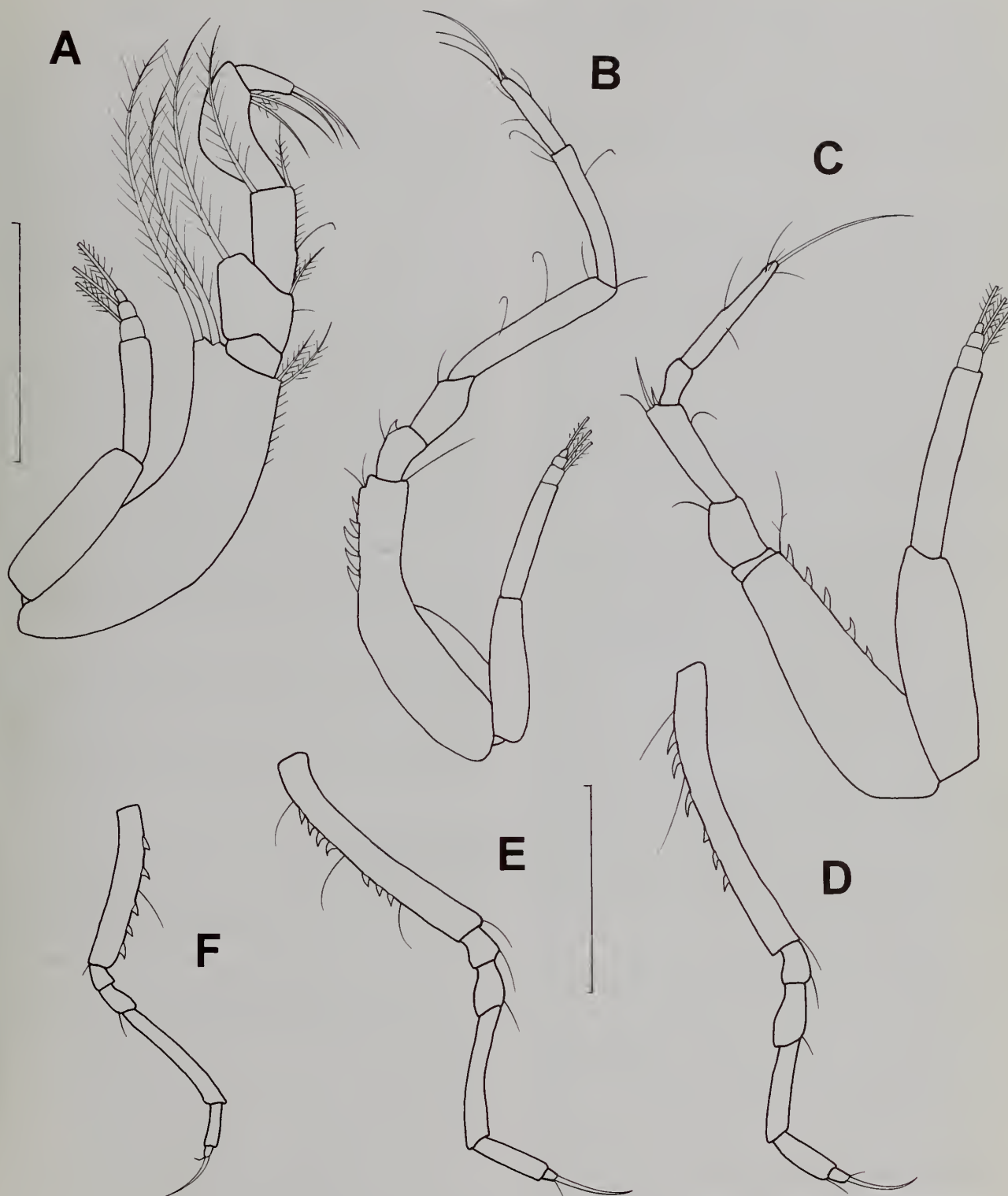


Fig. 15 *Styloptocuma formosum* (Jones, 1984) female A. maxilliped 3; B. pereopod 1; C. pereopod 2; D. pereopod 3; E. pereopod 4; F. pereopod 5. Scale bars (in mm): A 0.25; B – F 0.3.

2 articles and 2 plumose and one simple setae. Mandible (Fig. 14 C), pars incisiva and lacinia mobilis with 4 teeth. Maxilla 1 (Fig. 14 D), palp with 2 glabrous filaments. Maxilla 2 (Fig. 14 E), a row of fine, small setae between outer margin of protopod and endites. Maxilliped 1 (Fig. 14 F), carpus with hand-like flattened setae with 6 denticles, more fully developed and rounded dactylus. Maxilliped 2 (Fig. 14 G), with robust articles, propodus with plumose setae. Maxilliped 3 (Fig. 15 A), basis with a very short inner process, setules on outer margins of basis and carpus. Pereopods 3–5 (Fig. 15 D–F), basis with teeth on inner margin, 3rd pair with longer basis, 5th one with longer carpus, short dactylus with long curved terminal seta.

REMARKS. Antenna 1 (Fig. 14 A) as described in Jones (1984). Pereopod 1 (Fig. 15 B) has teeth on outer margin and 2nd pair (Fig. 15 C) has teeth on inner margin (versus glabrous in Jones).

Key for the identification of *Styloptocuma* species

- | | | |
|----|---|--------------------------------------|
| 1 | Eye lobe not exceeding pseudorostrum | 2 |
| – | Eye lobe exceeding pseudorostrum | 14 |
| 2 | Pseudorostrum passes beyond the level of the anterior corner | 3 |
| – | Pseudorostrum not or scarcely passing beyond the level of the anterior corner | 5 |
| 3 | Rows of spines on lateral sides of pleon | 4 |
| – | Without spines on lateral sides of pleon | <i>S. aculeatum</i> (Jones, 1984) |
| 4 | Spines on pseudorostrum, pereopods and uropods | <i>S. echinatum</i> (Jones, 1984) |
| – | No spines on pseudorostrum, pereopods and uropod | <i>S. erectum</i> (Jones, 1984) |
| 5 | Rows of spines on lateral sides of pleon | 6 |
| – | Without spines on lateral sides of pleon | 9 |
| 6 | Carapace with dorsal spines | 7 |
| – | Carapace without dorsal spines | <i>S. extans</i> (Jones, 1984) |
| 7 | Eye lobe reaching end of pseudorostrum | 8 |
| – | Eye lobe not reaching end of pseudorostrum | <i>S. concinnum</i> (Jones, 1984) |
| 8 | Eye lobe with an apical spine | <i>S. cristatum</i> (Jones, 1984) |
| – | Eye lobe without apical spine | <i>S. formosum</i> (Jones, 1984) |
| 9 | Carapace with dorsal spines | 10 |
| – | Carapace without spines | 13 |
| 10 | Carapace with double rows of dorsal spines | <i>S. subductum</i> (Jones, 1984) |
| – | Carapace with a single row of spines | 11 |
| 11 | Uropodal peduncle 2 × longer than 6th pleonite | 12 |
| – | Uropodal peduncle less than 2 × longer than 6th pleonite | <i>S. acuminatum</i> (Jones, 1984) |
| 12 | Carapace and uropods with many spines | <i>S. dayae</i> (Jones, 1984) |
| – | Carapace and uropods with fewer spines | <i>S. gracillimum</i> (Calman, 1905) |

- | | | |
|----|--|--|
| 13 | Uropodal peduncle 2 × longer than 6th pleonite | <i>S. angustatum</i> (Jones, 1984) |
| – | Uropodal peduncle less than 2 × longer than 6th pleonite | <i>S. inermis</i> (Ledoyer, 1997) |
| 14 | Pseudorostrum long | 15 |
| – | Pseudorostrum short | <i>S. longisipho</i> (Jones, 1984) |
| 15 | Two dorsal rows of spines on carapace | 16 |
| – | One dorsal row of of spines on carapace | <i>S. egregium</i> (Hansen, 1920) |
| 16 | Body and uropods densely spinose, pereopods less serrated | <i>S. antipai</i> Băcescu & Muradian, 1974 |
| – | Body and uropods with fewer, shorter spines, pereopods more serrated | <i>S. bishopi</i> (Jones, 1984) |

PHYLOGENETIC REMARKS

Both *Schizocuma* and *Styloptocuma* with mixed characters seem to be earlier separated from the branch of *Cumella* group than the other genera (*Almyracuma* Jones & Burbanck, 1959, *Atlantocuma* Băcescu & Muradian, 1974, *Claudicuma* Roccatagliata, 1981, *Cumella* Sars, 1865, *Cumellopsis* Calman, 1905, *Elasocumella* Watling, 1991, *Platycuma* Calman, 1905) and evolved in specific ways in the deep sea preserving more characters common with *Nannastacus* group (*Nannastacus* Bate, 1865, *Scherocumella* Watling, 1991, *Schizotrema* Calman, 1911), characters absent to the other deep sea mentioned genera of the *Cumella* group. *Styloptocuma* seems to be closer to *Nannastacus* within the group of *Cumella* than *Schizocuma*.

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REFERENCES

- Băcescu, M. 1972. *Archaeocuma* and *Schizocuma*, new genera of Cumacea from the American tropical waters. *Revue Roumaine Biologie. Série Zoologie*, **17** (4), 241–250.
- 1992. *Cumacea II* (Fam. Nannastacidae, Diastylidae, Pseudocumatidae, Gynodistylidae et Ceratocumatidae), 8, 175–468. In: Gruner, H. E. & Holthuis L. B. (eds) *Crustaceorum Catalogus*. SPB Academic Publishing, The Hague.
- & Muradian, Z. 1974. *Campylaspenis*, *Styloptocuma*, *Atlantocuma*, new genera of Cumacea from the deep waters of the Atlantic. *Revue Roumaine Biologie. Biologie Animale*, **19** (2), 71–78.
- Holthuis, L.B. 1990. *Styloptocuma* Băcescu & Muradian, 1974 (Crustacea, Cumacea): proposed conservation with designation of *S. antipai* Băcescu & Muradian, 1974 as the type species *Bulletin Zoological Nomenclature*, **49** (4), 264.
- Jones, N.S. 1984. The family Nannastacidae (Crustacea, Cumacea) from the deep Atlantic *Bulletin British Museum (Natural History.) Zoology* **46** (3), 207–289.
- Ledoyer, M. 1983. Contribution à l'étude de l'écologie de la faune vagile profonde de la Méditerranée nord-occidentale 2. Les Cumacés (Crustacea) *Tethys*, **11** (1), 77.
- 1997. Les Cumacés (Crustacea) des campagnes Eumeli 2., 3 et 4 au large du Cap Blanc (est Atlantique tropical) *Journal Natural History*, **31**, 841–886.
- Watling, L. 1991. Rediagnosis and revision of some Nannastacidae (Crustacea: Cumacea) *Proceedings Biological Society Washington*, **104** (4), 751–757.